

Tartu: District Cooling System

Overview

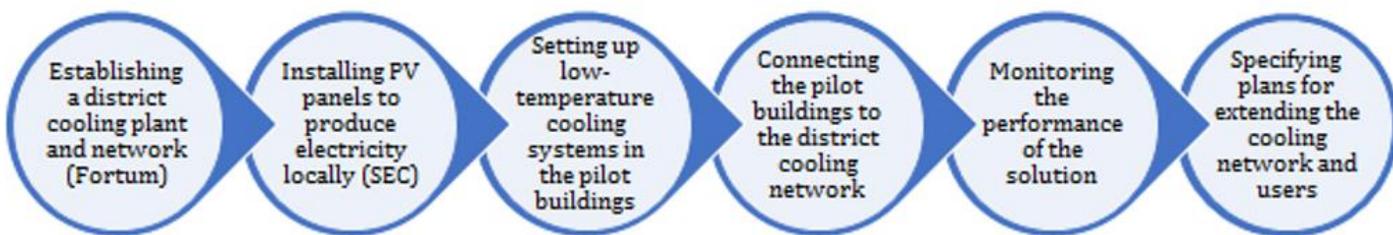
Recently, the heating system of the pilot area panel buildings was based on district heating networks with heat exchangers in boiler rooms. Hot water was produced locally with individual boilers that use electricity. The new district cooling system uses residual heat for producing water, which is supplied through the existing district heating network. More specifically, this system is based on a heat pump that, installed to return the flow of the district cooling system, and produces heat for the district heating system by using residual heat from cooling.

The district cooling system is using free solar energy from PV panels to cover a part of the cooling system's energy demand. As such, the use of fossil electric energy for producing hot water with electric boilers is replaced with residual heat and electricity produced by PV panels. The solution meets consumer demands for thermal indoor comfort and domestic hot water while retaining high energy efficiency and share of renewable energy.

Business Models

The main industry partner of this solution, AS Fortum Tartu, has a biofuel CHP plant in Tartu that ensures that most of the heat used in district heating is produced from renewable fuels. The total cost of the new cooling system investment is EUR 5.7 million, including a new cooling plant with the capacity of 13 MW. In cooperation with the SmartEnCity project, solar panels were installed to produce electricity from the plant's own energy needs.

Process



Benefits

- Connecting a (commercial) property to the district cooling network removes the need for refrigeration equipment and additional cooling units on rooftops
- Increased resource and energy efficiency
- Transferring thermal energy that is in the wrong place to the place where it is needed
- Increased business reputation from using an environmentally friendly cooling solution
- Job creation
- Autonomy of fossil fuels and independence of energy supply
- Reduction of carbon emissions
- Increase in grid stability
- Stable long-term return on investments

Citizen Engagement

Informing the pilot area residents about the renovation activities and discussing any issues with them has been a crucial part of the planning and implementation process. For boosting participation and interest in the project, several measures have been taken into use, including regular information meetings, technical consultations and forum discussions (see more under [citizen engagement solutions](#)).



Tartu: District Cooling System

Stakeholders

Owner(s)	AS Fortum Tartu
Service/Technology Provider	AS Fortum Tartu
Users	Local businesses, property owners
Investors	AS Fortum Tartu, H2020

Investment/Finance: Ca. 6.4 million Euro

Outcome

The district cooling system has been successfully implemented and over 10 km of cooling pipelines have been built in three years. The number of customers is steadily increasing. Over three years, over 7,000 MWh of cooling energy has been produced and the share of solar energy in the plant's energy consumption has increased

Replication Potential

District cooling systems are very beneficial in areas with dense population and high cooling demand. Besides residential buildings, there are plenty of businesses and shopping centers that all need cooling. In Tartu alone, Fortum has approximately 800 business customers and 75,000 residential customers in district heating who now have the opportunity to benefit from district cooling.

The factors that contribute to the solution's success in Tartu include:

- Tartu's city center is sufficiently populated;
- New buildings ensure the area's high energy density (ca. 7 kW/m);
- Fortum Tartu owns a riverside property;

The river water can be used for cooling from autumn to springtime and for cooling turbo compressors in summertime.

Contact

Margus Raud AS Fortum Tartumargus.raud@fortumtartu.ee	
---	--

More Details:

<https://smartencity.eu/about/solutions/district-cooling-system-that-uses-residual-heat-tartu/>

